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THE VALUE OF AN IMPAIRED LIFE

In last month's issue of the BULLETIN, we approached the subject of the economic losses which arise from some of the more fundamental impairments of human life as in the case of the blind, etc. In this number, we shall give an estimate of the economic value of such impaired persons.

Our method will be essentially the same as that previously followed in computing the value of the life of the normal man. It will be remembered that this computation was based on the earnings and the cost of living at every year of life, and on the proportion of persons surviving to every age of life. In the variant of the general method which is now to be applied to the case of impaired lives, the same factors will again enter, but we shall be dealing with a lower scale of earnings, reduced chances of employment, and, in some cases, a diminished expectation of life. In this present article we shall consider the situation only as it presents itself when there is no material diminution in the expectation of life, so that the normal life table can be used as before.

Having in mind, then, those impairments which have no material influence upon the expectation of life, and which, therefore, permit the use of the same life tables as heretofore, we shall consider three groups under this head, namely, those whose earnings are reduced to $500 per annum, to $1,000 per annum, and third, to $1,500 per annum. In each case the original status from which this reduction has occurred will be taken as the $2,500 per annum maximum income class.

The table on page 2 shows the values of an impaired life at the various ages at these several income levels.

In this table, the figures given in the fourth, seventh and in the last columns, headed "Employment 100 Per Cent. of Normal" assume the same degree of regularity of employment as in the case of a normal man. In point of fact, of course, one of the most serious factors in the

problem of the handicapped person is that his or her chances of obtaining employment are very often materially reduced. To take care of this very important factor we have, therefore, calculated additional values on the basis of varying degrees of employment. We submit additional values for 0 and 50 per cent. of the normal employment. The term "normal" is here used to denote the proportion employed at the several ages among the general male population.

It will be observed that a very large proportion of the entries in the various columns of this table are negative, that is, the person in

Value of a Man

Substandard Wage-Earners (with Undiminished Longevity)*

Age	Income Class $500			Income Class $1,000			Income Class $1,500		
	Employed, as Per Cent. of "Normal"			Employed, as Per Cent. of "Normal"			Employed, as Per Cent. of "Normal"		
	0	50	100	0	50	100	0	50	100
18	−9,878	−4,907	+ 64	−9,878	+ 65	+10,007	−9,878	+5,036	+19,949
20	−9,733	−4,782	+ 170	−9,733	+ 170	+10,072	−9,733	+5,121	+19,975
25	−9,348	−4,561	+ 227	−9,348	+ 228	+ 9,803	−9,348	+5,015	+19,378
30	−8,881	−4,371	+ 139	−8,881	+ 139	+ 9,159	−8,881	+4,649	+18,179
35	−8,342	−4,179	− 16	−8,342	− 16	+ 8,310	−8,342	+4,148	+16,637
40	−7,748	−3,984	− 220	−7,748	− 220	+ 7,309	−7,748	+3,545	+14,838
45	−7,112	−3,788	− 464	−7,112	− 464	+ 6,184	−7,112	+2,860	+12,832
50	−6,385	−3,558	− 730	−6,385	− 730	+ 4,924	−6,385	+2,097	+10,579
55	−5,635	−3,347	−1,058	−5,635	−1,058	+ 3,519	−5,635	+1,231	+ 8,097
60	−4,846	−3,141	−1,436	−4,846	−1,437	+ 1,973	−4,846	+ 269	+ 5,383
65	−4,037	−2,928	−1,818	−4,037	−1,818	+ 402	−4,037	− 708	+ 2,621
70	−3,326	−2,752	−2,177	−3,326	−2,177	− 1,027	−3,326	−1,602	+ 123

*Discount rate adopted in the computation of this table is 3½ per cent. per annum.

question becomes an economic liability instead of an asset; he has to be supported at an expense which exceeds his earnings. That this should be the case with the person who is completely incapacitated, so that the corresponding figures are found in the column "Employment 0 Per cent. of Normal," is what one would naturally expect. For such persons are all expense and no income. But, as will be seen, there are minus signs extending over many other parts of the table. Only in the case of the man who still succeeds in making an income of $1,500 a year, with full, normal chances of employment, are all the entries on the table positive.

An example may be helpful in showing how the table can be applied. Supposing a man, originally of the $2,500 maximum income class, is

injured, at age thirty, to such an extent that his income is reduced to the earning level of $1,000 a year, and at the same time his chance of obtaining employment is reduced to fifty per cent. of normal. We then consult the table in the income class $1,000 and "Employment Fifty Per Cent. of Normal" in the line corresponding to age thirty, and we find there the figure of $139. Before injury his value, at age thirty, was $31,038 according to the schedules previously published. Thus his value has been reduced by $31,038 minus $139 = $30,899, or in a round figure by $30,900.

Or, to take a second example, if a man at age forty is *totally* incapacitated, that is, his chance of employment is reduced to zero, then, we find in the table by the same process as before the value minus $7,748. The economic loss in this case then is given by his original value at age forty which was $25,795, minus his remaining value which itself is a minus quantity, namely, $7,748. Thus the loss is greater by $7,748 than if his value had just been reduced to zero. Clearly then the loss is obtained by adding together the amounts $7,748 and $25,795, giving as the resultant loss $33,543.

For values that are not explicitly shown on the table, it is possible, by simple interpolation, to obtain corresponding figures. Tables such as the one given on page 2 may be extended *ad libitum* to give further details and should prove valuable as a basis for adjudicating amounts of damages and compensation in cases coming before law courts or other authoritative bodies.

CERTAIN SEASONAL AND AGE ASPECTS OF MEASLES

We usually think of measles as a "cold weather disease"; and from the standpoint of the relative danger of contracting it, this is true. Analysis of the case reports from ten states during the five-year period, 1922-1926, shows that, without exception, the late winter and the spring months are the peak periods of measles prevalence; and that, with the coming of warmer weather, the case incidence invariably drops very sharply to a low point, which is reached in September. It is during the cold season, then, that the obligation of parents is greatest to guard children against "catching" this very dangerous and contagious disease and to cooperate with the health authorities in preventing children who have contracted it from infecting others.

But, once the disease is contracted, the greatest danger to the child's life is not during the cold months, but in the summer-time; for

this disease has the characteristic of being most deadly at the season when it is least prevalent. Uniformly, a greater proportion of measles cases die in August and September than at any other time of the year. It is thus in the warm months that the obligation of the parents of an infected child is heaviest to safeguard that child's very life (and the lives of other children) by calling the doctor without delay and by following his directions; for the child's life at this point depends on the watchfulness and care of the parents in guarding against the serious pulmonary complications which terminate fatally so many cases of measles.

The upper of the charts on page 5 shows clearly the higher case-fatality rates at the season of minimum prevalence of the disease.

Another contrast between maximum morbidity and lethality is in relation to age. The age of maximum prevalence of measles is the fifth year of life, but the age of maximum case-fatality is the first year. It is thus an important epidemiological characteristic of this disease that the greatest likelihood of dying from it (in early childhood, at least) is during infancy, when there is the least danger of contracting it. This does not obtain in adult life, however, for measles is then doubly serious.

It is, then, in the fourth and fifth years of a child's life that the parent's task is hardest, and his obligation to his child and the community greatest, to guard against infection with measles; but it is in the first year (and the second also) that his responsibility is utmost in guarding against a fatal termination.

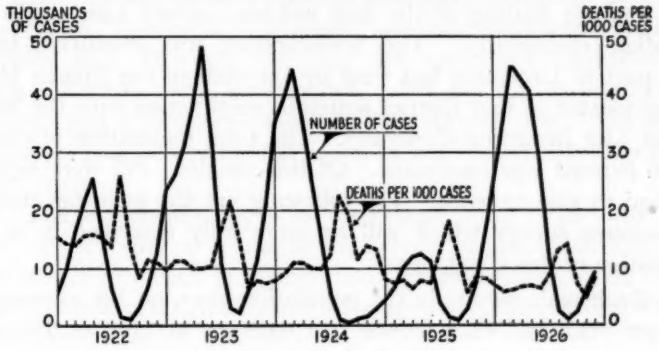
The second chart, based on a study of measles in New Jersey, for a six-year period, shows the case-fatality rates of measles during childhood.

The actual deathrate, that is, the number of deaths per 100,000 living, reaches its maximum in the second year of life, although there are many more cases in the third, fourth and fifth years than in the second.

But, regardless of age or season, the period of convalescence is the most important stage of measles. It is when the child is recovering that he is weakest from the malady's effects; it is then that pneumonia is most apt to set in; that the kidneys may be affected, and that acute nephritis, running later into chronic Bright's disease, may develop. The mortality from measles, uncomplicated, is not high at any age or season; it is the complications, especially bronchopneumonia, which make it one of the most dreaded afflictions of childhood.

SEASONAL INCIDENCE OF MEASLES

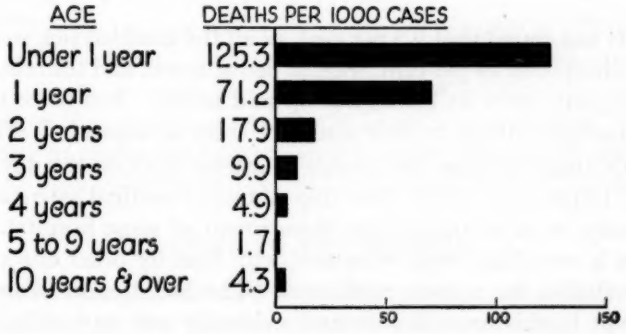
NUMBER OF CASES AND FATALITY RATE PER 1000 CASES
10 SELECTED STATES 1922 TO 1926



The greatest number of cases occur in the spring, but the case fatality rate reaches a maximum in late summer when the number of cases is lowest.

MEASLES CASE FATALITY AT SPECIFIED AGES

DEATHS PER 1000 CASES
NEW JERSEY, 1919 TO 1925



Measles is most frequently fatal among babies less than one year old. The hazard declines with age.

A SICKNESS SURVEY OF TWO MONTREAL PARISHES

More than two and one-half per cent. of the population residing in the parishes of St. Catherine and Sacred Heart in the city of Montreal were found to be so sick as to be incapacitated from work. This was the finding of the first sickness survey ever made in a Canadian community. The investigation was conducted in the early part of December last year by the staff of the French Health Center located in that district acting in cooperation with the Metropolitan Life Insurance Company. The total population of close to 19,000 persons was canvassed. Of this number, 495 were reported sick and unable to work. The following are the principal items in the sickness survey which will be more fully described in a later publication of this Company.

1. Each male person in the population loses, on the average, 8.9 days per year, and each female 10.1 days, on account of disability. The amount of time lost was highest in the older ages.

2. The chief causes of disabling sickness were the respiratory diseases and influenza, heart disease, cerebral hemorrhage, rheumatism, tuberculosis and external violence. In view of the recent epidemic conditions of typhoid fever in the city of Montreal, it is interesting to state that at the time of the survey not a single case of typhoid fever was discovered.

3. A considerable number of the sick had been disabled for long periods, nearly half reported having been ill one year or longer. Those sick less than a month constituted about 25 per cent. of the total.

4. It was found that 9.5 per cent. of all the disabled sick were confined to hospitals, 24 per cent. were in bed at home, and the remainder, 66.5 per cent., were at home, but up and about. But these persons were unable to attend to their usual activities because of disability.

5. Of those at home but unable to attend work on the day of the census, 18 per cent. stated that they obtained medical attention at a dispensary or at an out-patient department of some hospital. This average is very high when compared with that for other cities where similar studies have been conducted. The facilities for dispensary treatment in this area of Montreal evidently are very satisfactory.

6. The incidence of the various diseases at the different age periods has also been studied. In the ages below 15 years, the preponderant diseases were scarlet fever, whooping cough and diphtheria, and also pneumonia and the other respiratory diseases. In the

next age period, 15-34 years, influenza, tuberculosis, appendicitis and anemia were reported in largest number, and among females, conditions associated with child-bearing. In middle life, that is, between 35 and 54, diseases of the digestive system and diabetes were most important. External violence also was prominent in this age period and the so-called "degenerative diseases" assumed some importance. In the older ages, 55 years and over, the important conditions that caused disability were rheumatism, heart disease, kidney disease, accidents and respiratory diseases. This distribution of diseases by age, agrees generally with that found in the Metropolitan surveys of former years.

7. The services of a physician were employed in 76 per cent. of the cases. Every case of scarlet fever, cancer, appendicitis, and childbirth had a physician in attendance. Those diseases which showed the lowest proportion under medical care were colds, certain diseases of the nervous system and influenza.

8. Visiting nurses attended 20 per cent. of those disabled who were under the care of private physicians indicating that this population is better off with respect to visiting nurse service than that in the average American community.

Already this survey has borne fruit. In the first three months of 1927, the attendance at the clinics of the Health Center numbered 2,379, as compared with 1,346 in the same period of 1926, that is, an increase in attendance of 76 per cent. As a direct result of the introductory visit made by the nurse to the homes in this district, the services of the Health Center have been extended to many persons who otherwise would not have been reached.

Information relating to the prevalence of sickness in communities is of vital importance. Such data may be collected by the established health agencies in every city and a wealth of information obtained. It is hoped that other communities in Canada, as well as in America, will come to realize the value of such information and will arrange to have the data collected by the local public health or welfare agencies.

SUMMER DROWNINGS

Between January 1st and June 18th of this year, 345 Industrial policyholders of this Company lost their lives through accidental drowning. The cumulative deathrate for this five and one-half month period was 4.0 per 100,000 as compared with 3.2 for the same period of last year—an increase of 25 per cent. This year's rate is also higher than that for the early part of 1925.

Although the general tendency of the mortality rate for accidental drowning has been downward during recent years, the above mentioned rise, in 1927, makes it timely that we call attention to the fact that, with the advent of the warm season, drownings are sure to show a still further increase, with young men and boys the principal victims. This form of accidental death has a distinct seasonal incidence, July, August and September being the peak months, as the inevitable result of increased indulgence in water sports during the summer.

Even with the relatively lower deathrate of recent years, drowning still takes a serious death toll. We estimate that 7,300 deaths were due to this cause in Continental United States in the year 1925 and these deaths were very largely preventable. What is needed is a wider application of the principles and practice of water safety which are advocated by the Life Saving Division of the American Red Cross. These are observed very strictly in thousands of summer camps for boys and girls, which are now so popular in America; and the result is that with tens of thousands of campers spending a goodly share of their time in water, deaths from drowning are almost unknown. The reason is that not only is the swimming itself carefully supervised and the risk cut to a minimum but up-to-date rescue work and resuscitation methods are in many instances actually made a part of the camp curriculum.

HEALTH RECORD FOR MAY, 1927

The month of May, 1927, registered the lowest deathrate for that month ever recorded in the experience of the Industrial policyholders of the Metropolitan Life Insurance Company, who now number approximately eighteen millions. The figure was 8.7 per 1,000. This followed a rate of 9.5 for April, which was also the minimum for that month. Health conditions in the Industrial population of the United States and Canada during the period January 1 to May 31, in 1927, have been better than during the corresponding period of any preceding year. In January, February and March, this large cross-section of the population of the two countries also showed improvement over the same months of last year. Unless health conditions change materially during the remainder of 1927, it is obvious that this is destined to be a record health year.

Comparison with the figures for May of last year disclose pronounced improvement both with respect to most of the diseases that are of major numerical importance and with those of predominant public health interest, in view of their controllability. Tuberculosis,

pneumonia and influenza, which belong in both of these categories, registered declines in May, as they have in every preceding month of 1927. The rates for cerebral hemorrhage and Bright's disease dropped slightly. The mortality from heart disease and cancer, it is true, increased a little. In the case of the former, May was the first month this year to record a higher rate than in the corresponding month of 1926. Measles and whooping-cough rates were less than half those of May a year ago, but the mortality from diphtheria continued to run higher than in 1926, as has been the case during the current year, to date. Suicides in May, for the first time this year, were fewer than in the corresponding month of last year.

The rate for all causes combined showed the usual seasonal decline in May as compared with the record for the preceding month.

The deathrate for the large cities of the United States in May was 12.8 per 1,000 population as compared with 13.8 for the previous month and 13.7 for May, 1926. More cases of poliomyelitis and typhoid fever were reported than during the preceding month, but there was less scarlet fever, smallpox, diphtheria, influenza and measles. As compared with May a year ago there were more cases of poliomyelitis, scarlet fever, smallpox, typhoid fever and diphtheria with less influenza and measles.

The diphtheria situation improved slightly in May, but the disease was still prevalent in many parts of the country. In forty states 3,504 cases were reported in the first three weeks of May as compared with 3,904 during the same weeks of April.

There was a very pronounced drop, in May, in the number of reported cases of influenza, particularly in Georgia, Maryland, Tennessee and West Virginia. A quite serious outbreak of this disease occurred at Lynch, a small town in Kentucky, and in the neighboring country-side, in which more than 400 persons, out of a population of 8,000, were reported to be affected. Case reports of measles from thirty-eight states numbered 36,815 during the first three weeks of May as compared with 43,354 during the corresponding weeks of April and 69,044 during the corresponding weeks of May, 1926. The most noticeable declines were in Arkansas, Louisiana and North and South Dakota. Reports of sickness from scarlet fever also show improvement. The greatest declines in May, as compared with April, were in Nebraska, Oklahoma and South Dakota. In two states, Maine and Maryland, there was increased incidence of scarlet fever. There was an outbreak of this disease in mild form in Washington,

New Jersey, where it was thought best to close the schools and prohibit public gatherings.

There is undoubtedly much more poliomyelitis than at this time a year ago, although there have been no outstanding outbreaks of this disease.

The smallpox situation improved slightly in May, more particularly in Alabama and Georgia. Nevertheless, the number of reported cases increased in several states, notably Illinois, Michigan and Mississippi. There was an outbreak of this disease in the vicinity of Dowagiac, Mich., but fortunately, the smallpox was mild in type. It was reported that 887 persons were vaccinated.

Typhoid fever cases reported from forty states during the first three weeks of May numbered 801 as against 633 during the first three weeks of April. In Arkansas the number increased from seven cases in April to 54 cases in May; in Missouri, from eight to twenty-two; and in North Carolina, from five to twenty-nine.

There were a number of interesting public health developments during the month. In Hoosick Falls, N. Y., a town of about 5,000, children to the number of 679 were immunized against diphtheria. Many of these children were of pre-school age. The Pennsylvania State Health Department has established a section on industrial waste. Sanitary engineering surveys will be made and there will be inspection of industrial waste disposal followed by reports on methods for its treatment and disposal. According to dispatches to the National Headquarters of the Red Cross, 95 per cent. of the total population of the flood area have had at least one injection of typhoid serum, and half a million persons will be immunized against smallpox and typhoid. The medical director of the Red Cross states that 8,000 persons are being vaccinated daily against smallpox and 10,000 against typhoid. In addition thousands have been given doses of quinine as a precaution against malaria.

The following table shows the mortality among the Industrial policyholders for May, 1927, April, 1927; May, 1926, and the year 1926:

METROPOLITAN LIFE INSURANCE COMPANY

Deathrates* per 100,000 for Principal Causes, Premium-paying Business in Industrial Department (Annual Basis)

MONTHS OF MAY, 1927; APRIL, 1927, AND OF MAY, 1926

CAUSES OF DEATH	RATE PER 100,000 LIVES EXPOSED*			
	May, 1927	Apr. 1927	May, 1926	Year 1926†
TOTAL—ALL CAUSES	874.8	954.1	927.1	942.7
Typhoid fever	5.2	6.7	1.8	4.2
Measles	7.5	7.5	16.8	10.2
Scarlet fever	3.5	3.8	3.5	3.4
Whooping cough	6.5	7.6	11.2	9.6
Diphtheria	10.6	9.7	8.7	9.7
Influenza	18.7	27.1	39.0	31.0
Tuberculosis (All forms)	96.4	107.2	100.2	98.7
Tuberculosis of resp'y system	81.5	95.0	87.7	86.5
Cancer	68.4	77.0	66.4	73.5
Diabetes mellitus	16.0	17.5	14.2	16.7
Cerebral hemorrhage	49.3	56.6	50.9	55.5
Organic diseases of heart	130.8	137.3	128.5	133.9
Pneumonia (All forms)	84.3	110.7	110.0	97.9
Other respiratory diseases	16.3	16.6	12.7	13.1
Diarrhea and enteritis	17.7	15.2	15.6	29.8
Bright's disease (Chronic nephritis)	70.1	66.1	70.6	73.3
Puerperal state	14.7	14.7	15.4	15.3
Suicides	7.6	8.9	7.9	7.6
Homicides	7.6	6.0	6.0	7.0
Other external causes (excluding suicides and homicides)	53.6	54.8	54.4	62.2
Traumatism by automobiles	13.0	15.7	15.1	16.7
All other causes	189.8	203.2	193.3	190.4

*All figures include infants insured under one year of age.

†Based on provisional estimate of lives exposed to risk in 1926.

Correspondence on the subjects discussed in these BULLETINS may be addressed to: The Editor,

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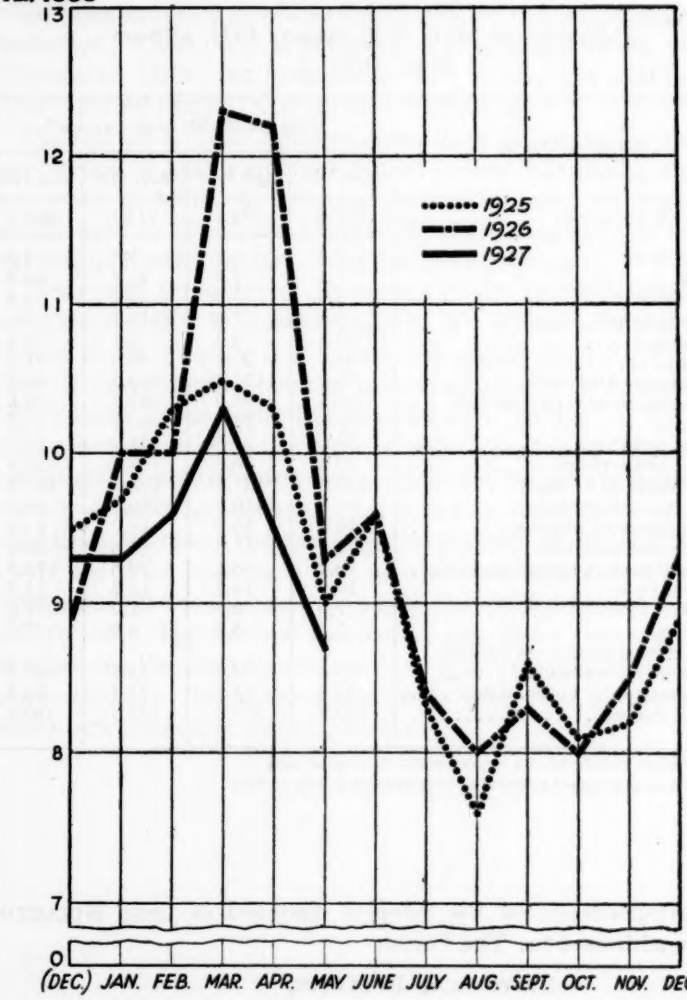
Deathrates from All Causes

METROPOLITAN LIFE INSURANCE CO.
INDUSTRIAL DEPARTMENT
(ANNUAL BASIS)



	(DEC.)	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1925		9.7	10.3	10.5	10.3	9.0	9.6	8.3	7.6	8.6	8.1	8.2	8.9
1926		10.0	10.0	12.3	12.2	9.3	9.6	8.4	8.0	8.3	8.0	8.5	9.3
1927		9.3	9.6	10.3	9.5	8.7							

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